



BU – LRAIC mobile

Input data definitions and questionnaire manual

July 2012

Introduction

The purpose of this questionnaire is to collect information, which is necessary for BU-LRAIC modeling. Costs of services would be calculated on the ground of a provided data.

The terminology used in this document is defined in legal acts of The Republic of Lithuania and is the same as Reference paper for creating bottom up long run average incremental costs model (BU-LRAIC).

Please provide requested data as accurate as possible. If You think, that there is a need to explain, comment or add additional remarks to data provided, please provide them in empty cells next to particular data or in a separate document.

As you will notice there is no timeline introduced in sheets "Service Statistics" and „Network Statistics“. Therefore the fixed values are foreseen to be used through the entire modeling period. However, if according to your judgment some data has high possibility to change dramatically and operator can provide forecast for 2012-2020 period mentioned, please leave comments next to the input cells.

If there are any questions or uncertainty regarding the questionnaire, please contact Giedrius Pūras ((8 5) 210 5668; giedrius.puras@rrt.lt) or Audrius Šniepis ((8 5) 210 5669; audrius.sniepis@rrt.lt) for more detailed explanation. Any technical questions about filling-in the questionnaire can be consulted directly with representative of Ernst & Young Baltic, UAB - Algirdas Zabarauskas, (8 5) 219 9830; algirdas.zabarauskas@lt.ey.com.

Thank You for Your contribution.

D1 – Service volumes

Please provide historical data for years 2010 – 2011 and projection data for years 2012 – 2022 (including). Provide year-end annual volumes of services.

Number of SIM cards

In this section (lines 9-11) number of active SIM cards on the last day of the year should be provided. The SIM cards are separated into post-paid and pre-paid categories. “Active SIM card” should be understood as defined in footnotes of Annex no 2 of Order of Director of Communications Regulatory Authority of the Republic of Lithuania on Description of General Terms and Conditions for Engaging in Electronic Communications Activities (Žin., 2005, Nr. 49-1641).

Voice traffic

In this section (lines 12-19) provide annual volumes of actual successful (including short numbers, emergency number, 800 series phone numbers and alike calls traffic in the network) voice call minutes (not rounded billing system data) in the network for a specific groups of minutes:

- ▶ On-net minutes (call minutes originated and terminated in own mobile network, including Mobile virtual network operator’s (further in the text – MVNO) and inbound roaming traffic (calls originated and terminated on the same network);
- ▶ Off-net minutes (call minutes originated in own network and terminated in fixed networks, in international networks and in other mobile networks, including MVNO’s and inbound roaming traffic (calls originated on network but terminated on the other network);
- ▶ Incoming minutes (call minutes originated in fixed networks, international networks and in other mobile networks, including MVNO’s and inbound roaming traffic (incoming roaming calls) and terminated in own network);
- ▶ Three types of transit minutes:
 - ▶ Transit 1 – transit of a call which was originated and terminated in Lithuania;
 - ▶ Transit 2 – transit of a call which was originated in Lithuania and terminated in foreign network;
 - ▶ Transit 3 – transit of a call which was originated in foreign network and terminated in Lithuania.

Data has to be provided in minutes. If network system gives information in accuracy of seconds, divide the volume by 60 and then provide the information.

Video traffic

In this section (lines 20-23) provide the annual volumes of actual successful video call minutes (not rounded billing system data) in the network for a specific group of minutes:

- ▶ On-net minutes (call minutes originated and terminated in own mobile network, including MVNO's and inbound roaming traffic (calls originated and terminated on the same network));
- ▶ Off-net minutes (call minutes originated in own network and terminated in fixed networks, in international networks and in other mobile networks, including MVNO's and inbound roaming traffic (video calls originated on network but terminated on the other network));
- ▶ Incoming minutes (call minutes originated in fixed networks, international networks and in other mobile networks, including MVNO's and inbound roaming traffic (incoming roaming video calls) and terminated in own network).

Data has to be given in minutes. If network system gives information in accuracy of seconds, divide the volume by 60 and then provide the information.

SMS traffic

In this section (lines 24-27) provide the actual annual volumes of SMS in the network, distinguished by specific group of SMSs:

- ▶ On-net SMS (SMS sent from own mobile network to own mobile network, including MVNO's and inbound roaming traffic (SMS originated and terminated on the same network));
- ▶ Outgoing SMS (SMS sent from own mobile network to international networks and to other mobile networks, including MVNO's and inbound roaming traffic (SMS originated on own network, but terminated on the other network));
- ▶ Incoming SMS (SMS sent from international networks and from other mobile networks, including MVNO's and inbound roaming traffic (SMS originated on the other network but terminated on own network) to own mobile network).

Data has to be given in units of SMS.

MMS traffic

In this section (lines 28-31) provide the actual annual amounts of MMS volumes in the network, distinguished by specific group of MMSs:

- ▶ On-net MMS (MMS sent from own mobile network to own mobile network, including MVNO's and inbound roaming traffic (MMS originated and terminated on the same network));
- ▶ Outgoing MMS (MMS sent from own mobile network to international networks and to other mobile networks, including MVNO's and inbound roaming traffic (MMS originated on own network, but terminated on the other network));

- ▶ Incoming MMS (MMS sent from international networks and from other mobile networks, including MVNO's and inbound roaming traffic (MMS originated on the other network but terminated on own network) to own mobile network).

Data has to be given in units of MMS.

Packet data traffic

In this section (lines 32-38) provide the actual annual volumes of packet data traffic for GSM, UMTS and LTE networks, distinguished by up-link and down-link traffic.

Data has to be given in Gbytes.

Coverage

In this section (lines 39-50) provide geographical coverage of GSM, UMTS and LTE network in rural, suburban and urban areas.

Data has to be given in percentages.

Traffic split

In this section (lines 51-54) provide the traffic split between radio networks (GSM, UMTS, LTE) as percentage of total traffic (excl. packet data traffic). And in lines 55-57, please provide the voice traffic split (excl. packet data traffic) served by either MSC or MSS with MGW.

Data has to be given in percentages.

D2 – Service statistics

In the first section (lines 9-20) please provide latest actual packet data traffic distribution in GSM and UMTS network. Provide proportions for actual GPRS data traffic, actual GPRS WAP traffic, actual EDGE data traffic, actual EDGE WAP traffic in GSM network as a percentage of total billed packet data traffic in GSM. Also provide proportions for actual UMTS data traffic and actual HSDPA data traffic in the UMTS network as a percentage of total actual packet data traffic in UMTS.

Data has to be given in percents.

Also please provide UMTS, HSDPA and LTE maximal bit rates in Kbit/s achieved in operator's network as well as the amount of channel elements provided in UMTS and HSDPA operator's radio networks.

In the second section (lines 21-23) please provide average number of bytes per packet as well as average data session length in Mbytes.

In the third section, voice - tariff differentiation statistics (lines 24-27) – please provide the following data:

- ▶ Peak to off-peak tariff differentiation ratio - ratio of peak tariff for retail calls to off-peak tariff for retail calls

$$\left(\frac{\text{peak tariff}}{\text{off-peak tariff}}\right);$$
- ▶ Peak traffic proportion - ratio of voice traffic in peak period to total daily traffic;
- ▶ Off-peak proportion - ratio of voice traffic in off-peak period to total daily traffic.

In the fourth section (lines 28-30) please provide priority factors, used in LTE packet data network, should reflect that specific quality parameters required by particular services, which have impact on utilization of network resources. This value should be from 100-500%, where 100% means lowest priority and 500% represent services with highest quality parameters, requiring five times the amount of original service bandwidth.

In the fifth section, VoIP assumptions (lines 31-39) –presents technical assumptions regarding VoIP technology, in particular:

- ▶ Voice codec used - questionnaire includes predefined list of VoIP codec, Operator should choose codec which he uses, which is supported by its network equipment or which he is planning to use;
- ▶ Payload of each network layer protocols: RTP / UDP / IP / Ethernet - presents theoretical size of each protocol header.

In the last section (lines 40-49) please provide utilized interconnection ports for voice service traffic. Here we ask to provide the number of E1, STM-1 and STM-4 interface ports utilized by voice service traffic (incoming, outgoing and transit) between different operators.

Also we ask to provide the capacity parameters of E1, STM-1 and STM-4 interfaces in the number of E1 channels which can be provided through each of the interfaces.

D3 – Headroom allowance

In this section provide latest network elements' capacities, design utilization factors and planning horizons. Every network element has different technical specifications and their capacities are measured with different units. For example, BTS capacity is measured in TRXs amount, VMS capacity - mailboxes amount. Capacity assessment units for every element are given in the questionnaire.

Base unit capacity (column F) shows physical or technical capabilities of a network element base unit. For example, TRX card can accommodate 8 channels or HLR can service 1,200,000 subscribers.

Data has to be given in measure units as indicated next to each element in the questionnaire column D.

Extension unit (EU) is additional equipment for network element base unit. EU capacity (column G) shows physical or technical capabilities of EU of a network element. For example, TRX cards extension is 0 channels, which means TRX card base unit cannot be extended.

Data has to be given in measure units as indicated next to each element in the questionnaire column D.

Maximal technical capacity of a network element (column H) shows maximal physical or technical capabilities of network element's base unit and its possible extensions put together.

Data has to be given in measure units as indicated next to each element in the questionnaire column D.

Design utilization factor at a planning stage (column I) is equipment (vendor designated) maximum utilization parameter joined with the redundancy factors present in the operators network. This utilization parameter ensures that the equipment in the network is not overloaded by any transient spikes in demand and in case of failure there are enough for backup. Simple formula of parameter estimation is presented below:

$$Utilization\ factor = \frac{Redundancy}{Vendor\ recommended\ utilization\ rate}$$

Data has to be given in percents.

Planning horizon (column J) shows the time it takes to make all the necessary preparations to bring new equipment online. Data has to be given in a certain period of time (weeks, two weeks, months, quarters, have year, year or two years).

D4 – Network Statistics

In this section provide latest network statistics data available, which comprises of coverage parameters, traffic split between networks and cell types, sites configuration, transmission statistics and other.

▶ Coverage parameters (lines 8-32):

Data of the latest network coverage distribution parameters by geographical areas as a percentage of total coverage in Republic of Lithuania is to be provided. Parks, forests, which get in urban area, are treated as suburban or rural area. In the questionnaire it is asked to provide total proportions of geographical areas. If geographical area with suburban attribution is in urban area, it should be included in the suburban area proportion. Next, please provide data on HSDPA presence in UMTS networks entering 1 if the service is present in particular area and 0 if not. For instance if HSDPA service is present in rural areas – insert 1.

▶ LTE, UMTS and GSM traffic (lines 33-58; 81-123):

In this section please provide latest data on particular network actual traffic split between geographical areas as a percentage of total particular network actual traffic and particular geographical area actual traffic split in particular cell types as a percentage of particular geographical area actual traffic.

Data has to be given in percentages.

▶ LTE, UMTS and GSM sites configuration (lines 60-79; 134-153; 169-191):

In these sections provide latest information about the macro cell amount split between different sectorization cell types for every geographical area as a percentage of macro cell amount in particular geographical area. Next, please provide average sectors amount per site for micro and pico cells.

▶ UMTS cell parameters (lines 125-132):

Please provide latest information of the macro (for urban, suburban and rural areas) micro and pico cells downlink capacity in kbps for HSDPA radio network provision.

▶ **BTS (lines 155-167):**

Please provide latest information about the amount of spectrum (900 and 1800MHz) used in the BTS as well as average spectrum reuse factors and maximal TRXs amounts, which can be physically installed in a cell, separately for macro, micro and pico cell. Please note, that single band capacities are to be provided.

▶ **Transmission (lines 193-216):**

In this section for the BTS/NodeB/eNodeB-BSC/RNC/EPC and the BSC/RNC/EPC-MSC/MGW/IMS logical layers provide the following data:

- ▶ Split of the different microwave links utilized in the BTS/NodeB/eNodeB-BSC/RNC/EPC layer;
- ▶ Split of the transmission capacities between microwave links and leased lines in the BSC/RNC/EPC-MSC/MGW/IMS layer;
- ▶ Percentage of stand-alone radio links of the total radio links present in the network;
- ▶ Average number of sites per radiolink.

D5 – HCC Data

Please provide HCC elements' parameters, given in the questionnaire table:

- ▶ Network equipment current prices (columns D-E) in LTL or EUR depending on invoice of the equipment currency. The current cost is calculated by using current (or the latest) market prices (replacement cost) or adjusting the average historical cost for asset specific price changes and therefore getting more realistic values of assets and other resources used in business. In the situation, when fixed assets current prices cannot be evaluated, historical costs may be also used as a proxy for current costs. Note that license, frequency fees and leased lines are provided on actual basis of year 2012 records in financial accounting. The prices should include all possible discounts taken or offered and should be consistent with dimensioning rules, i.e. if extension element is by each 10 TRX than price for extension should be given for 10 TRX as well.
- ▶ Useful asset lifetime (in years) (column F). This value can be interpreted as economic or book useful asset lifetime, however book useful asset lifetime is not relevant to the BU-LRAIC modeling, therefore economic useful asset lifetime has to be provided. Useful asset lifetime is not calculated for license, frequency fees and leased line costs.
- ▶ Price index (column G) - contains year to year price change ratios for network elements. Please provide the latest available year to price trend, which should be calculated based on prices from contracts with equipment vendors or offers for equipment purchase.

D6 – Sectors' attributes

In order to reconcile model results and current network situation, comparison of the values is needed, therefore please provide latest information about sectors in the GSM and UMTS network by in the questionnaire table listed attributes:

- ▶ Sector identification number (column B);
- ▶ Base station type of sector (BTS, eNodeB or NodeB) (column C);
- ▶ Location of a sector (name of a city, a village or other) (column D);
- ▶ Site identification number, where a sector is (column E);
- ▶ Presence of HSDPA in the sector (column F);
- ▶ Frequency band of a sector (900, 1800, 1900, 2100 or 2500) (column G);
- ▶ Average busy hour voice traffic in erlangs (column H);
- ▶ Average busy hour data traffic in Mbytes (column I);
- ▶ Macro cell's range in km (column J);
- ▶ Sector type (macro, micro or pico) (column K);
- ▶ Geographical area of a sector (urban, suburban or rural) (column L).

There is a certain amount of rows in the questionnaire for description of sectors given. Please insert new rows before row "n" in order to add more sectors.

D7 – CAPEX

This page includes gross book values, net book values and historical yearly depreciation for the defined groups of assets. The values for each group should be provided based on Fixed Assets Register and should reconcile to the last audited not-consolidated financial statement for year-ended 31 December 2011. The following groups of assets have been defined:

- ▶ Network – assets presenting network equipment (lines 7-13):
 - ▶ Site infrastructure;
 - ▶ BSS/RNS/PSS infrastructure (BTS, eNodeB, NodeB, etc.);
 - ▶ Transmission (microwave links, radio links, etc.);
 - ▶ MSC/MGW/IMS and other NSS equipment (MSS, HLR, etc.);
 - ▶ Data network equipment (SGSN, GGSN, PCU, etc.).
- ▶ IT systems - assets presenting financial, inventory, CRM IT systems (lines 15-17):

- ▶ Tangible assets;
- ▶ Non-tangible assets.
- ▶ Network management system – general - assets presenting NMS system which cannot be assigned to particular network elements groups defined in next point;
- ▶ Network management system - assets presenting NMS system which can be assigned to particular network elements group, in particular (lines 21-26):
 - ▶ BSS/RNS/PSS infrastructure (BTS, NodeB, eNodeB, etc.);
 - ▶ Transmission network (microwave links, radio links, etc.);
 - ▶ MSC/MGW/IMS and other NSS equipment (MSS, HLR, etc.);
 - ▶ Data network equipment (SGSN, GGSN, PCU, etc.).
- ▶ Land and Building (lines 28-31):
 - ▶ Towers;
 - ▶ Buildings;
 - ▶ Fiber cables.
- ▶ Support – assets including motor vehicles, fixtures, fittings and office equipment including PCs;
- ▶ Non-tangible assets, as well as the concessions for 900, 1800, 2100, 2500 bands.
- ▶ Other assets, not listed above.

At the end of the section, please provide the total value of the fixed assets. In the second section, please provide the percentage split of IT systems by functions.

D8 – OPEX

This page includes gross expenditures for the defined groups of costs. The provided expenditures should comprise the sum of the following captions in Profit and Loss accounts (lines 8-12):

- ▶ Material-type expenditures;
- ▶ Payments to personnel;
- ▶ Other expenditures.

They also should reconcile to the audited not-consolidated financial statement for year-ended 31 December 2011. Groups of the expenditures listed above should include all of the expenditures listed in the financial statement. In order to bring the expenditures into more detail, the following groups of operational costs have been defined:

- ▶ Network operation, maintenance and planning expenses, for the following groups of network equipment (lines 16-22):
 - ▶ Site infrastructure;
 - ▶ BSS/RNS/PSS infrastructure (BTS, eNodeB, NodeB, etc.);
 - ▶ Transmission (microwave links, radio links, etc.);
 - ▶ MSC/MGW/IMS and other NSS equipment (MSS, HLR, etc.);
 - ▶ Data network equipment (SGSN, GGSN, PCU, etc.).
- ▶ IT systems operation and maintenance expenses;
- ▶ Sales, Marketing and Customer Care expenses (incl. dealer commissions);
- ▶ Finance and Administration costs;
- ▶ Leased lines fees;
- ▶ Frequency fees for BTS, NodeB, eNodeB and microwave links;
- ▶ Telecommunication concession and fees toward national authorities;
- ▶ Other telecommunication fees toward other operators;
- ▶ Wholesale and regulatory cost (only headcounts costs);
- ▶ BTS/NodeB/eNodeB sites rental fees;
- ▶ Other network site rental costs;
- ▶ Office rental cost;
- ▶ Energy costs;
- ▶ Postal and billing costs;
- ▶ Interconnection costs;
- ▶ Roaming costs;
- ▶ Fees and taxes, which do not fall into any expense groups listed above;
- ▶ Other expenditures, not listed above.

D9 – Network design assumptions

In first section “Spectrum assumptions”, provide the amount of spectrum (2100MHz for UMTS (lines 52-53) and 2600MHz for LTE (lines 9-10)) utilized in NodeB’s and eNodeB’s respectively. Please take into account that for UMTS, provide spectrum utilized excluding the HSDPA radio.

In the second two sections (lines 7-87) please provide eNodeBs' and NodeBs' downlink and uplink macrocell range in rural, suburban and urban geographical areas considering two scenarios - minimal and maximal capacity scenarios.

The minimal capacity scenario assumes minimal number of users and minimal interferences from other sectors/users.

The maximal capacity scenario assumes maximal number of users and maximal interferences from other sectors/users.

Also please provide eNodeBs' and NodeBs' maximal site capacity of kbps for rural, urban and suburban geographical areas as well as minimal site capacity in kbps for single data channel.